ABSTRACT

Archaeological investigations are an integral part of the permitting process for land development in Hawai‘i. The State recognizes that conservation of its historic and cultural heritage is important and that its cultural resources are nonrenewable. A recent archaeological survey for prehistoric and historic agricultural features in the Hōkūli‘a luxury development on Hawai‘i Island afforded an opportunity to test maximum entropy theory as a method for predicting the presence of archaeological features. The Maxent computer program uses a machine learning algorithm that utilizes presence point data and environmental variable rasters to produce a probability distribution of the species of interest. The "species" of interest for this research were agricultural clearing features, associated with sweetpotato (*Ipomea batatas*) cultivation, identified in a portion of Hōkūli‘a which lies within the Kona Field System. Previous agricultural habitat suitability models for Hawai‘i were used to determine the environmental variables used in this research; the variables included annual rainfall, summer rainfall, elevation, and slope. Maxent produced a probability distribution that matched the expectations of the conceptual model. The model was validated using diagnostic tools included in the Maxent program (1) area under the receiver operator characteristic curve analysis, (2) jack-knife testing, and (3) environmental variable response curve analysis, as well as three research hypotheses. The model does not account for human behavior and may overestimate feature presence in uncultivated, spiritually important areas that are suitable for farming. The results of this research show that Maxent can be used to successfully model certain types archaeological features.